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MOUNT WASHINGTON
CARRIAGE ROAD.

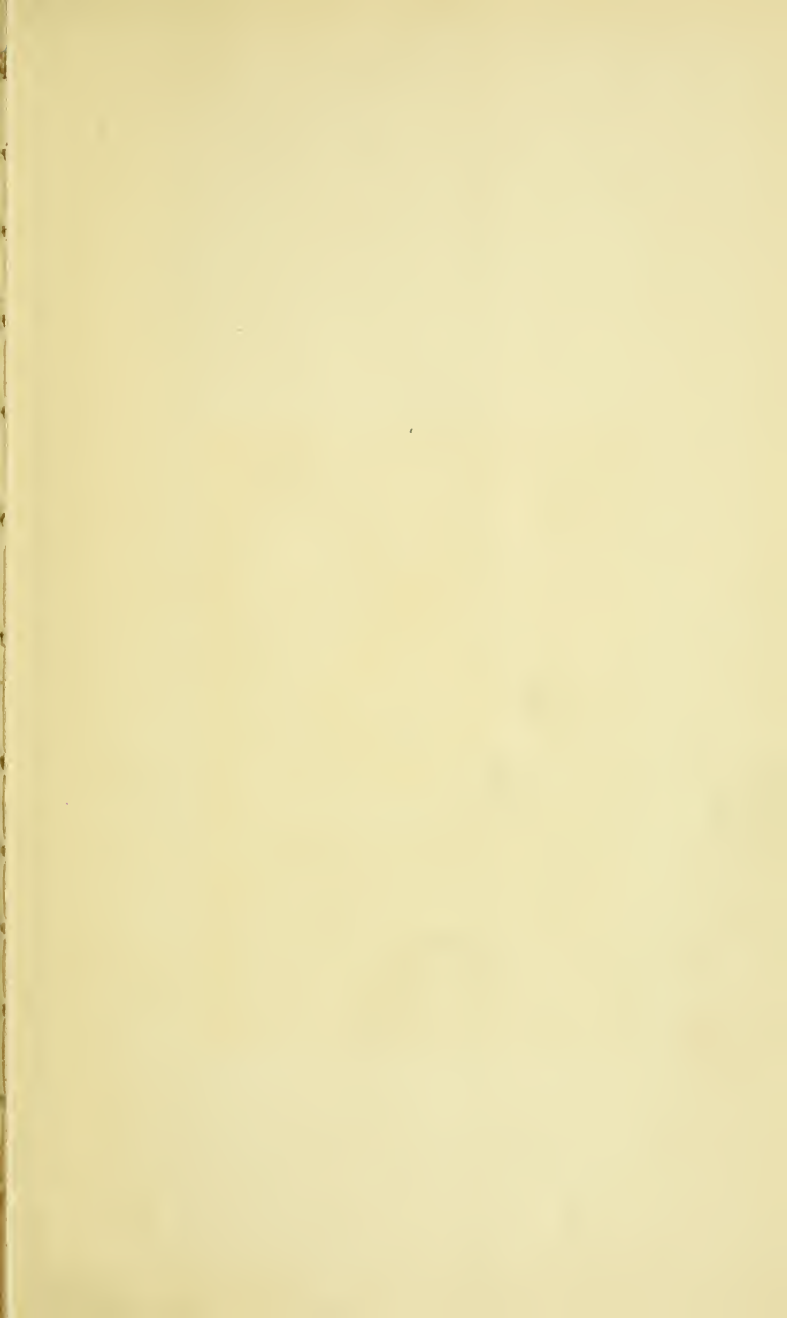


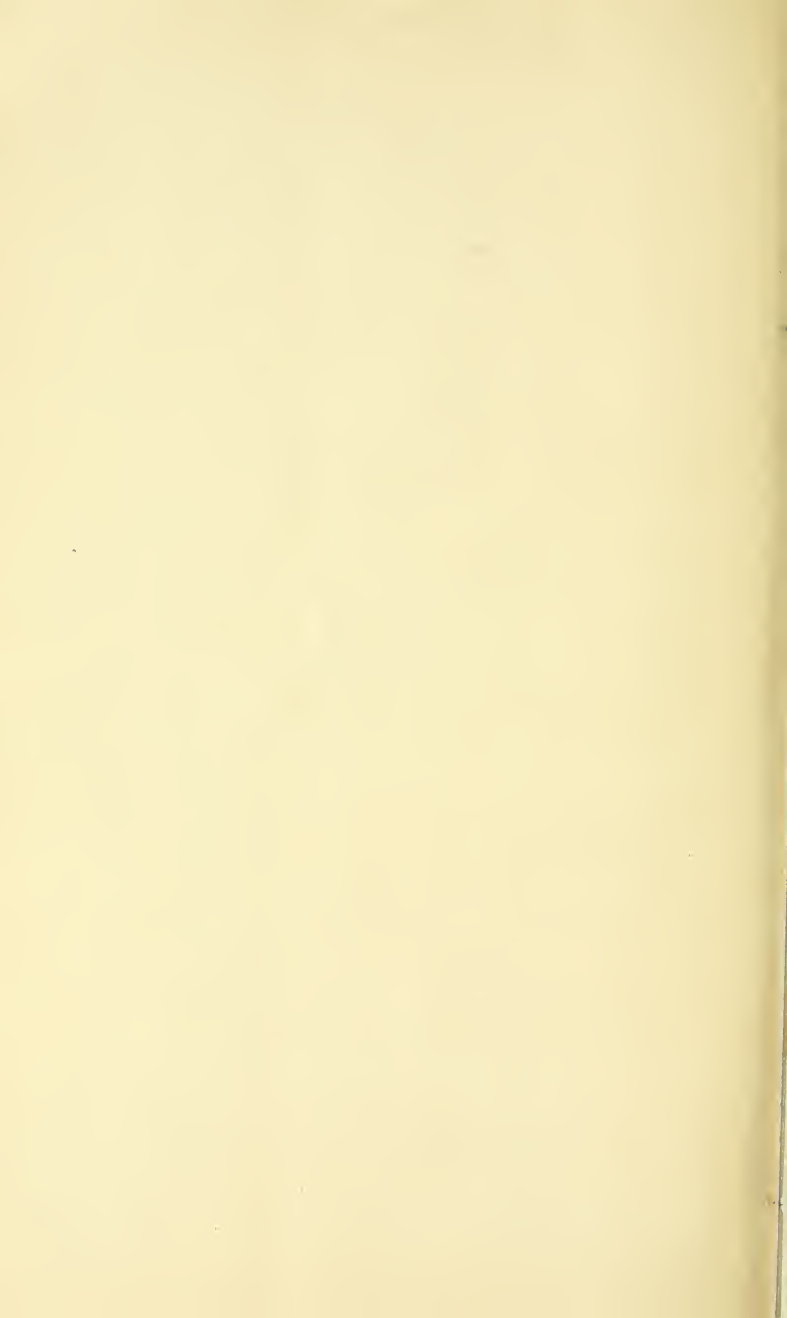


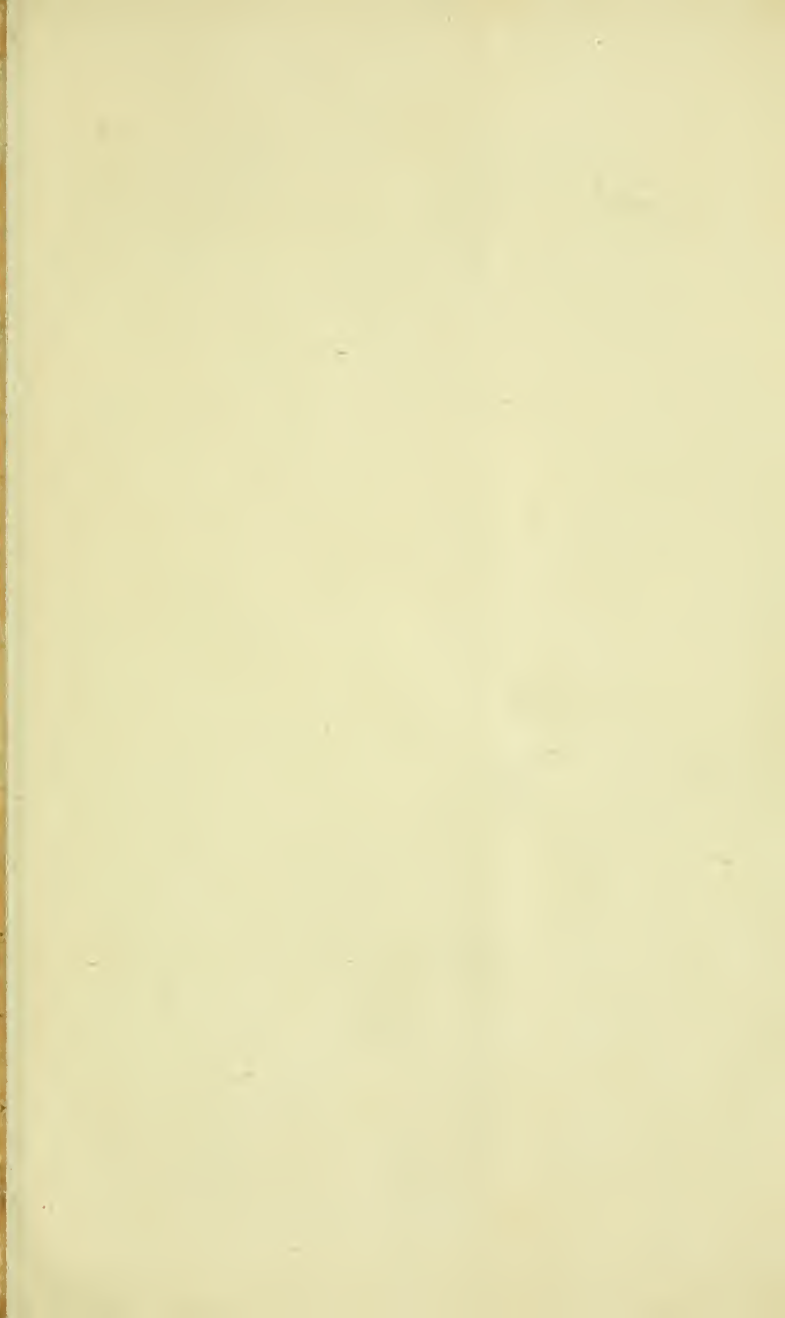
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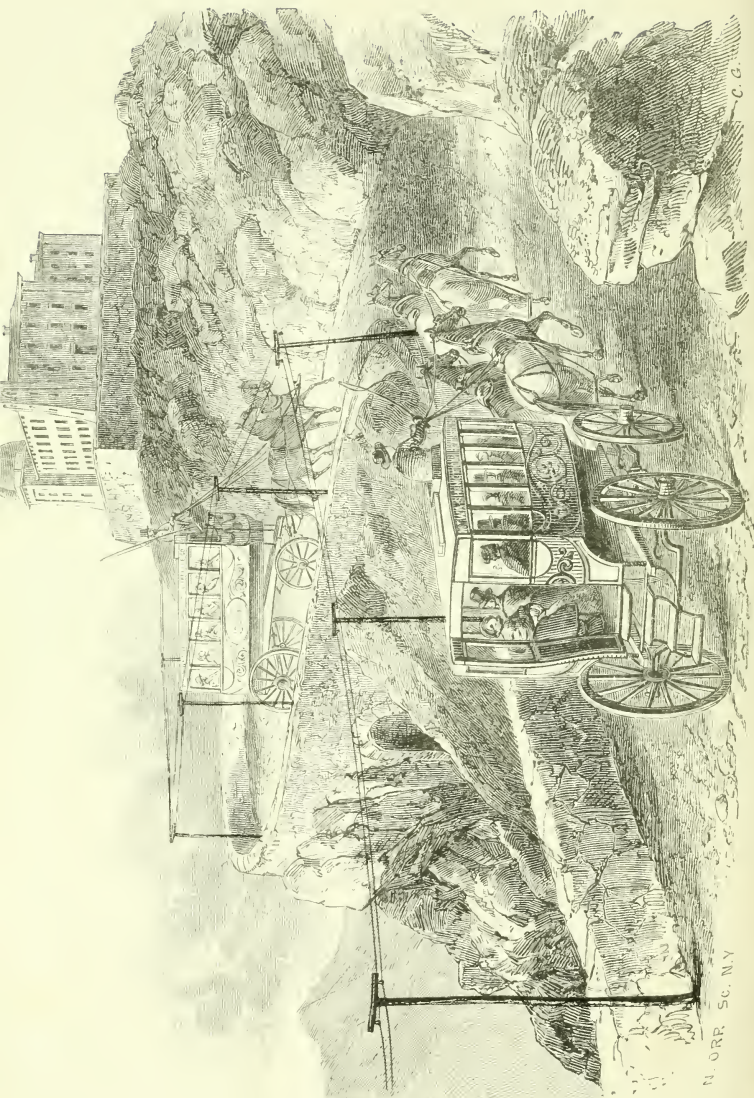
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Ascent of Mount Washington.

CARRIAGE ROAD.

Surveys and Location.

✓ THE Charter to construct this Road, was granted by the State of New Hampshire, in July, 1853. The Surveys for the location, were commenced immediately, under the direction of Mr. ROBERT E. RICKER, an Engineer, whose ability and experience was such, as to warrant the belief, that neither skill, care, nor labor would be spared in faithfully executing the difficult task before him. The result has shown, that the Directors of the Company were not mistaken in the man. It is now *known*, that the very *best* location, both as to *grade* and *expense*, has been chosen in ascending the mountain, while, at the same, time the most interesting and maguificent points of observation are obtained all along the line of the Road, to the summit of Mount Washington, the last mile of the Road being made to entirely encircle the upper cone of the mountain, while, at the same time, the regular ascending grade continues to the level plateau on the top, 6285 feet above the Ocean.

It is proper here to remark, that in locating the "Mount Washington Carriage Road," from the base to the summit of the mountain, eight miles and one-quarter in length, it is believed that more *care*, *time*, *skill* and *expense* has been expended than upon the *same length* of

any *Railroad* line in the United States. The field work under Mr. RICKER, and his able assistant, Mr. CAVIS, who is now the Superintendent of the Road, was not completed until late in the fall of 1853, and the map and profiles were prepared during the following winter, and *this* map, being about 7 feet by 3, is the first and only reliable one ever yet made of the White Mountains, in the vicinity of, and including Mount Washington.

CHARACTER OF THE ROAD.

The Road from the Glen House to the summit of Mt. Washington is 8 1-4 miles in length, and 16 feet in clear width between the ditching and the outer angle of the roadway or protection wall. The outside of the road is raised one foot higher than the inside, thus giving it a slope toward the mountain, inwards, of 3-4 of an inch to one foot. This prevents the washing out, or injuring of the road-bed by water; an ample ditch being constructed on the inside with sluices under the road, sufficient for drainage of rain or snow-freshets. The grade of the road in no place exceeds a rise of one foot in seven the average being one in nine and a half, and the construction is after the best manner of the *English McAdamized roads*, there being from 4 to 8 inches thickness of fine broken stone on the entire surface. The grade of this road is lighter than that constructed over the Alps by Napoleon; but there being no tunnels to cut or heavy masonry arches to construct, as in that famous road the cost of this per mile is far less. While the surveys for the Mt. Washington Road were in progress, Mr. Stephenson, the celebrated English Engineer, visited New Hampshire, in company with Messrs. Betts and Jackson,

English Contractors on the Grand Trunk Railway, the latter gentlemen having taken stock in this enterprise—Mr. Stephenson strongly recommended, that the grade of the Road should be so reduced as to enable the Company hereafter to use steam in ascending and descending, and he was at *that time* engaged in constructing a similar Railway over the Appenines. It was, however, determined for the present, to be content with a McAdamized road of the best character.

In all places where there is any dangerous precipitancy, a heavy protection-wall is built on the outer side of the Road, three feet thick and 2 1-2 feet high.

PROGRESS AND COMPLETION OF THE WORK.

As early in the Spring of 1854 as the melting of the snows would allow, contractors were notified, and an examination of the line and proposals for the construction of the work invited. Such examinations were made by a number of Railroad Contractors from time to time, but the novel character of the work, (no mountain road of the kind ever having been built in the United States,) and the formidable difficulties to be encountered in its construction, together with the detailed *strictness* of the *specifications*, all combined to prevent a contract being entered into, until July 20th, when the Company concluded one with Messrs. Rich & Meyers of Massachusetts.

The work was begun in the month of August 1854, but, unlike any other road, this could only be commenced at *one point, the base of the mountain*, as the Contractors were obliged to *construct* a road as they progressed,

over which they could haul by teams, all their provisions, tools, etc. etc. Any other course would have greatly increased the cost of construction, as all such provisions and tools must have been "backed up" by men, there being no possibility of getting a horse along the line, over the *rocks*.

For the reasons above stated, the progress of this work up to this time has been necessarily slow; but as the most difficult portion is now completed, (4 miles of it was used for horse travel during the last season) and a point above "The Ledge" reached, there will be a *certainty* of completing the road to the Summit, so as to use carriages in July 1856.

CARRIAGES FOR THE ROAD.

It is perfectly evident upon reasonable reflection, that any vehicle built *solely* to run upon a road having a uniform ascent of more than five hundred feet to the mile, should be constructed somewhat *different* from those intended to run upon a level, or a slightly undulating surface. Upon this, much thought and care has been expended by the President of the Company, and the result has been that an Omnibus has been planned, and nine of them are now being built by Downing & Sons, of New Hampshire, for carrying passengers up and down this road. The improvements are:—

1st. The body of the carriage will be *level*, both when *ascending* and *descending* the Mountain.

2d. The 12 inside passengers are so placed by a new arrangement of the seats, as neither to face the *horses* nor *one another*, but will sit at an angle of 45° to the side of the Omnibus, each in a separate arm-chair seat, giving free view on either side of the road, and protected by

plate-glass windows when necessary, having *more* than the usual room in the middle of the Omnibus to pass in and out.

3d. The safety of the Passengers is fully provided for by a new application of brakes, they being applied by the use of a *wheel* which is operated by the driver's *feet* and the "*set*" upon the wheels regulated by a ratchet or clip, fitting into the shaft wheel of the brake.

4th. To insure still greater safety in descending the Mountain, the application of the brake is placed within the reach of the *Passengers* by a strap and ring lying on the bottom of the Omnibus, and by using which, any one *inside* may *instantly* arrest the motion of the Omnibus, by blocking the hind wheels.

Thus the road is fitted to the carriages, and the carriages to the road, for it is a mistake to suppose that horses, however true and steady, can hold a load down an *undeviating descent* of eight miles, without a *more* than ordinary arrangement of safety brakes.

In connection with the project of building a carriage road to the top of Mt. Washington, there is still another, which, in its grasp of importance, and interest with the whole community, far outweighs the first, and which, so far as it has become known, meets with unlimited approbation. It is the erection by the Road Company of a *National Observatory* for the Government on the summit of the Mountain, in connection with a large and substantial Hotel, and to place so much of the house as shall be necessary, together with the free use of the Road, *entirely* at the disposal of the Government.

The arguments in favor of establishing a permanent building on the top of Mount Washington, for Scientific purposes, are numerous and weighty. Among them are :

1st. Mt. Washington is the highest *accessible* point of

land in the United States, east of the Rocky Mountains, being 6285 feet above the level of the sea, according to actual measurement, made by William A. Goodwin, Esq., Civil Engineer, in 1852, who was employed for that purpose by the Atlantic and St. Lawrence Railroad Company.

2d. The construction of a McAdamized Carriage Road, chartered by the State of New Hampshire, in July, 1853, and which will be completed in 1856, will render the ascent of the Mountain easy and safe for a great portion of the year.

3d. A line of Telegraph is to be constructed to the Summit of Mt. Washington, and is already commenced connecting with the line now in operation from Portland to Montreal, and which line connects at Portland, with lines to Boston, New York, Washington, Cincinnati, &c.

4th. A large Hotel is to be erected on the top of the Mountain, by the Mt. Washington Road Company, which Hotel, together with the necessary out buildings, will occupy *all* the available space on the Summit, which is suitable for such purposes, and which is already laid out, and can be completed during the year 1856 or '57, the company who erected the *first* building of any kind on the Summit, and have merged all their interests in the new building.

5th. The Mt. Washington Road Company have recently obtained by purchase, the *title* and *possession* of the Summit of Mt. Washington, and hold the same by a *full guarantee* from those perfectly able, to defend them in such title and possession, against any and all claimants; and this purchase covers as much of Mt. Washington as may be necessary for their Road, and buildings of every kind in connexion with the same.

6th. It has been ascertained by experience, that it is almost impossible to so wholly isolate the main or centre pillar of those buildings devoted to *accurate astronomical observations*, as to be *entirely* free from vibration effected

by external causes. Even at Greenwich (England) this difficulty is experienced in the use of delicately adjusted instruments. But it is believed that this obstacle may be *wholly* overcome by making the Summit of the rock-rooted Mt. Washington, the foundation of such a pillar.

7th. When the building, with an Observatory attached, shall be completed, and finished with the necessary instruments, scientific observations *may* be kept up throughout the *entire year*, giving, over the Telegraph wires, to Washington, New York, Cincinnati, &c., three times each day (viz. sun-rise, meridian and sun-set,) the record of the *Thermometer, Barometer* and *Wind.* and also the duration and *power* of *storms.*

8th. Mt. Washington has been for years past, and may be for years to come, the culminating point of many of the most important and interesting observations connected with the *Coast Surveys*, under charge of Professor Bache, and which are now becoming of so much acknowledged *practical utility* to the great commercial interests of the United States, and of the *world.*

9th. It is evident that, if an Observatory for the use of the Government, and the benefit of the public, is *ever* to be erected on the Summit of Mt. Washington, it *should* be built in connection with the House, now about to be commenced, and both constructed in the most *durable* and *permanent* manner, not only to resist the force of the elements, but also, for the safety and comfort of those whom it may be necessary to station there during the winter season, for scientific observations, and who will be wholly inaccessible to those below, for at least five consecutive months.

10th. The proposition to the United States Government will embrace *all the advantages* of furnishing an excellent road for its use, and keeping the same in repair, erecting a tower for scientific observations, with movable dome, and with a centre isolated pillar, on which to

place instruments, with sufficient rooms for observations, and also for the use of any scientific corps it may be necessary to place there, with appurtenances for heating the same during the winter months. These rooms, together with the Observatory, to be *entirely* under the control of the *Government*, and, if desirable, built under the inspection of scientific gentlemen to be named by the President.

The following, is an extract from the Petition of the Company, which has been prepared, and which will be presented to Congress at its next session :

“The PRESIDENT and DIRECTORS of the MOUNT WASHINGTON ROAD COMPANY, propose to the *United States Government* to build for the Government and for scientific purposes an *Observatory* on the top of Mount Washington, in the State of New Hampshire, in the manner following, to wit :

1st. The Observatory to be 25 feet square, with walls 4 feet in thickness, and to be not *less* than 40 feet high *above* the top of Mount Washington.

2d. The rooms inside to be 17 feet square, or of an octagon form, and a *stone pi'lar* to be erected in the center from the *foundation* to the *top*, *entirely* disconnected with the walls, with *stone beams* projecting from it in the several stories, for the reception of *Transit Instrument. Transit Clock, Artificial Horizon, &c. &c.*

3d. The walls of the Observatory to be built of stone in the most *substantial* and *durable* manner, with a *traverseing dome*, fitted according to the most approved scientific buildings of this character.

4th. The Observatory to be erected as a Tower to and in connection with, a large substantial stone building, drawings and plan of which are herewith submitted to be three stories high, with flat roof, and calculated to accommodate 200 visitors during the summer months.

5th. The "Mount Washington Road Company," under their charter of incorporation, a copy of which is herewith submitted, are building a substantial Carriage Road from the base to the top of Mt. Washington with an average grade not exceeding one foot in nine, and eight miles long, to be completed before July, 1856.

6th. The Company will place this road at the service of the U. S. Government and will transport all *instruments, furniture, and persons* belonging to or connected with the Government Observatory, over the same *free of charges of any kind, at all times* when the said road shall not be rendered impassable by the elements.

7th. The Mt. Washington Road Company will erect a substantial line of Telegraph wires from the top of Mt. Washington, to connect with the line already in operation along the line of the Atlantic and St. Lawrence Railroad, which is distant only *eight miles* from the base of the mountain, and which Telegraph line connects at Portland (Maine,) with the lines extending to New York, Philadelphia, Boston, Washington, Cincinnati, and other portions of the United States.

8th. To facilitate the continuation of scientific observations during the *entire year* on the top of Mt. Washington, The Mt. Washington Road Company will place at the disposal of the U. S. Government, such portions of the building as shall be necessary for the accommodation of those who may be in the employment of the Government, or of any *Scientific Society* approved by Government, *without charge*, and will transport *at their own cost*, over their road, all fuel, provisions, &c, for the support and convenience of such persons.

9th. To enable the Mt. Washington Road Company, to *build* this National Observatory for the Government, in the manner stated above, and in accordance with plans of the same herewith submitted, and for the *furnishing a Carriage Road, Telegraph* communication, and all the facilities above stated for the use of the United States

Government, and the cause of Science throughout the world, they ask in consideration an appropriation of \$100,000 to be expended under a joint commission of two persons, the one to be named by the Government, and the other to be the President of the Mt. Washington Road Company !'

The Charter of the Mt. Washington Road Company, authorizes them to continue their road over the summit of Mt. Washington and down to the County road on the opposite side.

All the surveys for this continuation have been made during the *past season*, and the maps and profiles are now being prepared.

The number of annual visitors to the White Mountains, has been on the increase for the last twenty years, and during the past summer, was over 20,000. To accommodate this travel, there are now *ten Hotels* in the vicinity of Mt. Washington, which have been erected as Summer houses, and although most of them are *large*, they were found entirely inadequate to accommodate the wants of visitors during the months of July and August.

It has been ascertained by experience and observation of those persons, who are recovering from protracted illness -those whose mental and physical energies have been prostrated by continued exertions, and those who have suffered by a long residence at the South, that a visit to the *White Mountains* almost immediately restores health and vigor to mind and body. These facts are not of recent or sudden development, but have been gradually elicited by years of experience, and the result is, that many of our most eminent physicians recommend a visit to the White Mountains, as an almost certain cure to

their convalescing patients. The sensation of lightness and exhilaration, and of strength and vigor experienced by all those who ascend Mt. Washington, seems to look to a cause greater than the purity of the air and water.

May not the following letter from Prof. JOHNSTON of the Wesleyan University of Middletown Conn., throw some light upon this subject :—

MIDDLETOWN, CT, Nov. 10th, 1855.

MY DEAR SIR:—

You request an estimate of the *difference* of the average pressure of the atmosphere, upon the whole surface of the human system, at the Glen House and the Summit of Mt. Washington, and also at the level of the Sea and the Summit of the same mountain.

Dr. Lardner, (Handbook of Hydrostatics, &c., Philadelphia, 1851, page 72,) estimates the whole surface of a full grown person of medium size at 2000 square inches, which, considering the ordinary pressure of the atmosphere at sea-level to be 15 pounds to the square inch gives 30,000 pounds, as the whole pressure of the atmosphere upon the system.

We will assume this to be correct, and suppose further, that at the same time, the mercury in the barometer would stand at 30 inches.

Now, other things being equal, the whole pressure upon the system at different stations, or at the same station at different times, will always be exactly proportional to the height of the mercury in the barometer, at these times. Dr Charles T. Jackson, found the barometer to stand, on the Summit of Mt. Washington, August 21st and 22d, 1840, at 24.301 inches (average of fourteen observations) and about the same time it stood at the base (Crawfords) at 28.236 inches. At Portsmouth the same day, 38 feet above tide-water, it stood a little above 30 inches. (Final Report on the Geology and Mineralogy of New Hampshire, pages 287, 288 and 300.)

From these data we have the following results, viz :

Pressure upon the system at Sea level 30,000 pounds, or 15 tons.

Do. do. at Crawford's 28.236 "

Do. do. at Summit, 24.301 "

Difference of pressure between sea-level and Crawford's, 1764 lbs

Do. do. sea-level and Summit, 5699 "

Do. do. Crawford's and Summit, 3935 "

I have no data from which to estimate the pressure at the Glen House, but I suppose it would be very nearly the same as Crawford's.

Respectfully Yours,

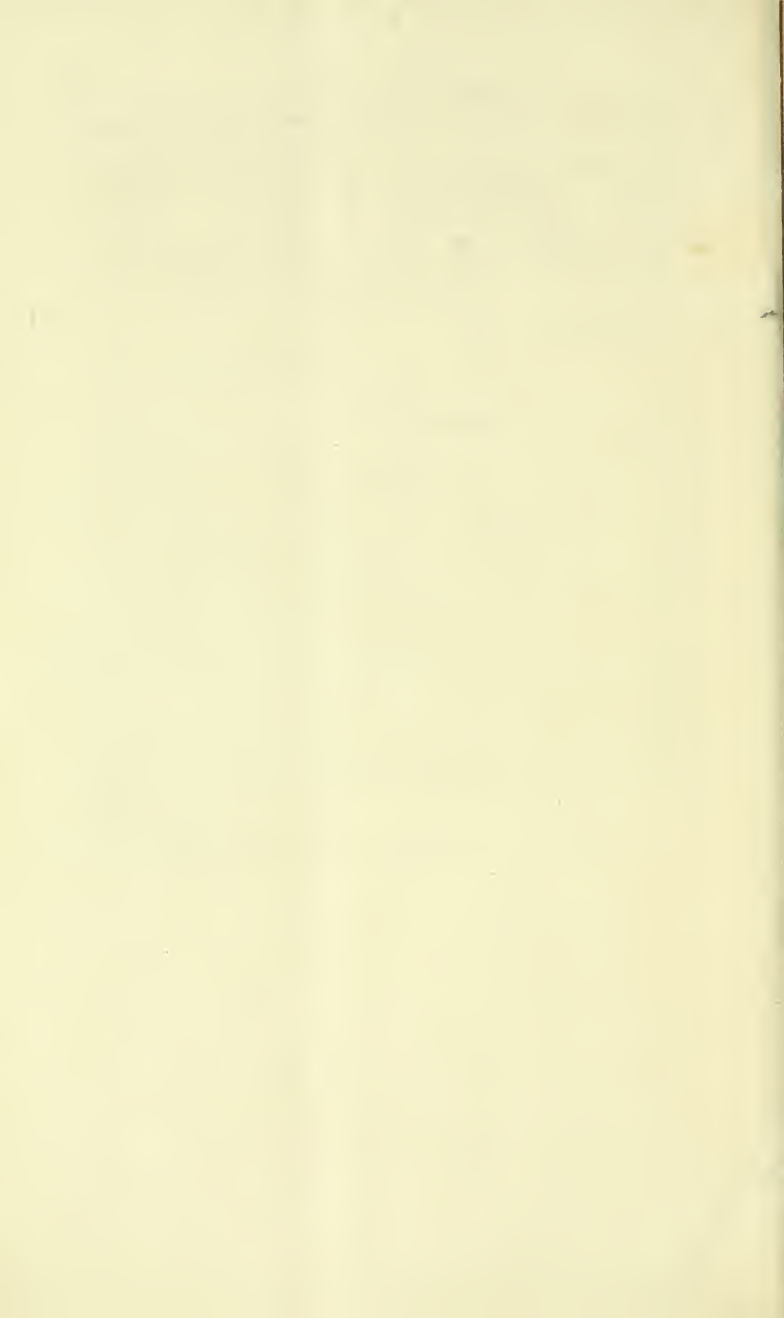
JOHN JOHNSTON.

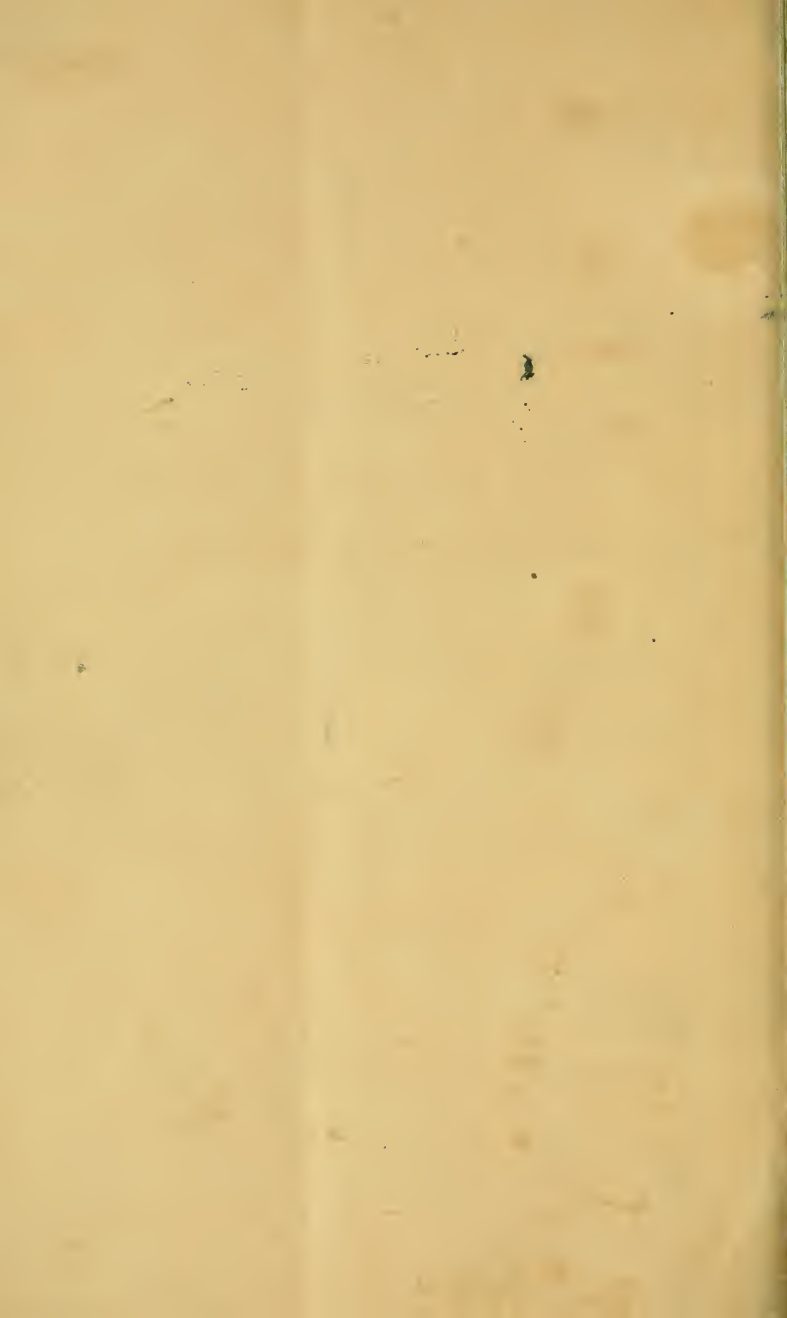
D. O. MACOMBER, Esq.

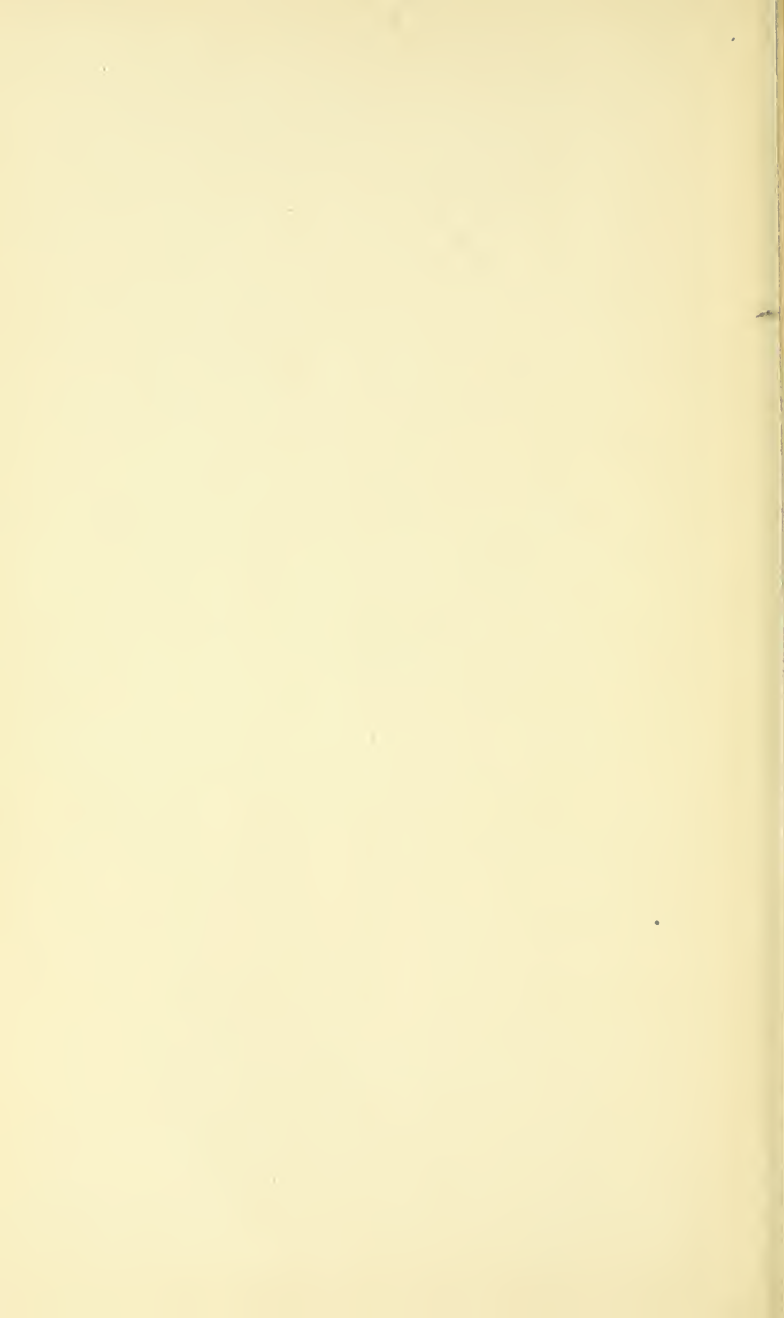
President Mount Washington Road Co.

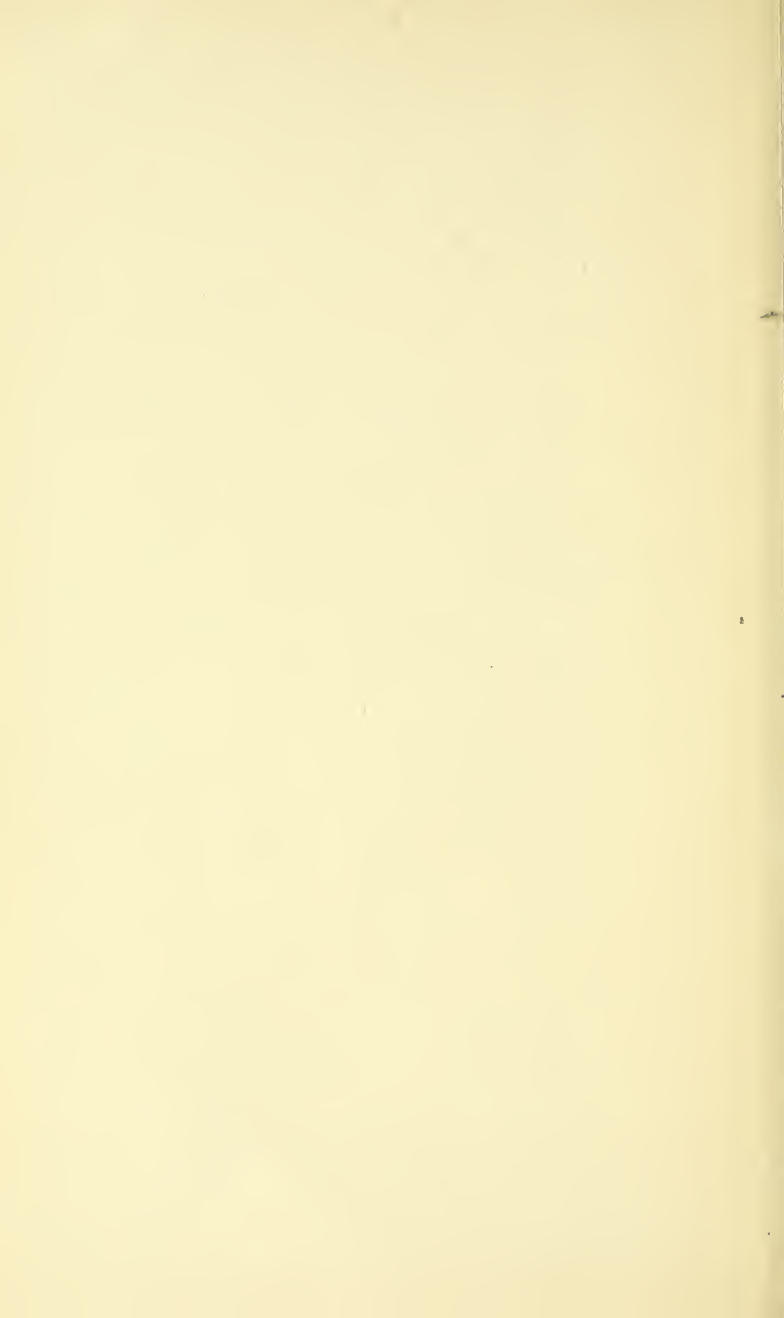
All who visit the White Mountains are desirous of *ascending* Mt. Washington, and, it is believed, *will do so*, when the road is completed, and they can ascend with ease, safety and comfort. Mt. Washington has ever been considered as an object of *national interest*. The seekers of health and pleasure, or relaxation from business, from every part of the Union, and from Canada, and the Provinces meet and mingle here in quiet enjoyment. There is every reason to believe that this will continue and *increase* so long as the summer solstice brings its burning heat, and man prefers the health-giving breeze of the mountain to the sultry, sickly air of the city and town.

New Hampshire, Dec. 1st, 1855.









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